

Nail varnish composition comprising a block polymer

The present invention relates to a nail
varnish free from nitrocellulose comprising a block
5 polymer. The invention also relates to a makeup or care
process for the nails. These compositions may be
applied to human nails or to false nails.

The compositions to be applied to the nails,
of the type such as solvent-based nail varnishes or
10 nailcare bases, usually comprise at least one film-
forming polymer, optionally plasticizer, pigments,
rheological agents and solvents.

Nitrocellulose is a film-forming agent
commonly used in solvent-based nail varnishes to obtain
15 glossy compositions with good strength.

Nitrocellulose is a polymer consisting of an
assembly of partially nitrated anhydroglucose rings
obtained by esterification of some of the free hydroxyl
functions of a cellulose with nitric acid in the
20 presence of sulfuric acid.

At the present time, nitrocellulose is still
the main film-forming agent the most widely used in
solvent-based nail varnishes in formulations with
optimized gloss and strength.

25 However, formulations comprising
nitrocelluloses have the following drawbacks:

- they make it possible to obtain films with satisfactory levels of hardness and gloss, but with unsatisfactory strength over time, especially due to the poor chip strength of the film;
- 5 - they give hard films that lack adhesion to the nail. This drawback may be overcome by adding plasticizers, but, in this case, very large amounts of plasticizers and of co-resins, of the order of that of nitrocellulose, need to be used. Furthermore, the
10 presence of plasticizers in these formulations is reflected, after film formation and drying, especially by a change in the properties of the film over time, due both to slow evaporation of the residual solvents contained in the film after drying, and to a potential
15 loss of some of the plasticizers, especially by evaporation, resulting in hardening of the film over time and poor chip strength.

Certain known formulations comprising nitrocellulose have the drawback of yellowing on the
20 nail over time. In addition, the manufacture of nitrocellulose, its transportation and its incorporation into formulations pose safety problems which are such that it is sought to replace it with other film-forming agents.

25 The studies conducted with regard to the replacement of nitrocellulose with other film-forming agents such as polyacrylics and polyurethanes in nail

varnishes, for instance the aqueous polyurethane dispersions described in document EP 0 648 485, have not given satisfactory results, especially in terms of strength and resistance to external factors such as water or detergents.

Patent application US 2002/18759 describes an acrylic acid/butyl methacrylate copolymer as film-forming polymer for partially replacing nitrocellulose. Nail varnishes containing this polymer do not show sufficient strength and in particular sufficient gloss strength, and require the addition of plasticizers.

The Applicant has discovered a novel route for formulating a nitrocellulose-free nail varnish that has good gloss and strength properties.

This nail varnish also makes it possible to obtain plasticization of films without the need to add large amounts of external plasticizers, while at the same time maintaining a good level of hardness of the films and good impact strength and/or chip strength of the varnishes on the nail, and thus an improvement in the strength over time of the varnishes on the nail and/or in their wear resistance.

One subject of the invention is, more specifically, a nail varnish composition comprising, in a cosmetically acceptable organic solvent, at least one linear ethylenic film-forming block polymer, the said composition being free of nitrocellulose, the block

polymer being such that, when it is present in sufficient amount in the composition, the mean gloss at 20° of a deposit of the said composition, once spread onto a support, is greater than or equal to 50 out of
5 100.

A subject of the invention is also a nail varnish composition comprising, in a cosmetically acceptable medium, at least one linear block ethylenic film-forming polymer as described below, the said
10 composition being free of nitrocellulose.

The term "nitrocellulose" means any nitrated cellulose derivative, in particular nitrocellulose.

According to the present invention, the term "film-forming polymer" means a polymer that is capable
15 of forming, by itself or in the presence of an auxiliary film-forming agent, a continuous film that adheres to a support, and especially to keratin materials.

The term "nitrocellulose-free composition" means a composition containing less than 5%, preferably less than 3%, preferably less than 2%, preferably less than 1%, preferably less than 0.5%, preferably less than 0.1% and preferably less than 0.05% of
20 nitrocellulose.

25 A subject of the invention is also a non-therapeutic cosmetic process for making up or caring for the nails, comprising the application to the nails

of at least one coat of the nail varnish composition as defined above.

A subject of the invention is also a nail varnish composition comprising at least one film-
5 forming linear ethylenic block polymer, the said composition being free of nitrocellulose, to obtain a film, once spread onto a support, which has a gloss at 20° of greater than 50 out of 100, and which incidentally has good strength.

10 ***Mean gloss of the composition***

The term "mean gloss" means the gloss as may be conventionally measured using a glossmeter by the following method.

A coat of between 50 μm and 150 μm in
15 thickness of the composition is spread using an automatic spreader onto a Leneta brand contrast card of reference Form 1A Penopac. The coat covers at least the white background of the card. The deposit is left to dry for 24 hours at a temperature of 30°C, and the
20 gloss at 20° is then measured on the white background using a Byk Gardner brand glossmeter of reference microTri-Gloss.

This measurement (between 0 and 100) is repeated at least three times, and the mean gloss is
25 the mean of the at least three measurements taken.

The mean gloss of the composition measured at 20° is advantageously greater than or equal to 50 out of

100, better still greater than or equal to 55, even
better still greater than or equal to 60, even better
still greater than or equal to 65, even better still
greater than or equal to 70 or even better still
5 greater than or equal to 75 out of 100, or even greater
than or equal to 80 out of 100.

Preferably, the mean gloss of the
composition, once spread onto a support, measured at 60°
is greater than or equal to 50, better still greater
10 than or equal to 60, better still greater than or equal
to 65, better still greater than or equal to 70, better
still greater than or equal to 75, better still greater
than or equal to 80, better still greater than or equal
to 85 or better still greater than or equal to 90 out
15 of 100.

The mean gloss at 60° is measured as follows.
The gloss may be conventionally measured using a
glossmeter by the following method.

A coat of between 50 μm and 150 μm in
20 thickness of the composition is spread using an
automatic spreader onto a Leneta brand contrast card of
reference Form 1A Penopac. The coat covers at least the
white background of the card. The deposit is left to
dry for 24 hours at a temperature of 30°C, and the
25 gloss at 60° is then measured on the white background
using a Byk Gardner brand glossmeter of reference
microTri-Gloss.

This measurement (between 0 and 100) is repeated at least three times, and the mean gloss is the mean of the at least three measurements taken.

According to one embodiment, the gloss of the composition measured at 20° is preferably greater than or equal to 60, preferably 65, 70 or 75 out of 100, and/or the gloss of the composition measured at 60° is preferably greater than or equal to 80, 85 or 90 out of 100.

10 **Block polymer:**

The composition according to the present invention contains at least one block polymer. The term "block polymer" means a polymer comprising at least two different blocks and preferably at least three different blocks.

According to one embodiment, the block polymer of the composition according to the invention is an ethylenic polymer. The term "ethylenic polymer" means a polymer obtained by polymerization of ethylenically unsaturated monomers.

According to one embodiment, the block polymer of the composition according to the invention is a linear polymer. In contrast, a polymer of non-linear structure is, for example, a polymer of branched, starburst or grafted structure, or the like.

According to one embodiment, the block polymer of the composition according to the invention

is a film-forming polymer. The term "film-forming polymer" means a polymer that is capable of forming, by itself or in the presence of an auxiliary film-forming agent, a continuous film that adheres to a support and
5 especially to keratin materials.

According to one embodiment, the block polymer of the composition according to the invention is a non-elastomeric polymer.

The term "non-elastomeric polymer" means a
10 polymer which, when subjected to a stress intended to stretch it (for example by 30% relative to its initial length), does not return to a length substantially identical to its initial length when the stress is removed.

15 More specifically, the expression "non-elastomeric polymer" means a polymer with an instantaneous recovery $R_i < 50\%$ and a delayed recovery $R_{2h} < 70\%$ after having undergone a 30% elongation. Preferably, R_i is $< 30\%$, and $R_{2h} < 50\%$.

20 More specifically, the non-elastomeric nature of the polymer is determined according to the following protocol:

A polymer film is prepared by pouring a solution of the polymer into a Teflon-coated mould
25 followed by drying for 7 days under ambient conditions regulated to $23 \pm 5^\circ\text{C}$ and $50 \pm 10\%$ relative humidity.

A film about 100 μm thick is thus obtained, from which are cut rectangular specimens (for example using a punch) 15 mm wide and 80 mm long.

This sample is subjected to a tensile stress using a machine sold under the reference Zwick, under the same temperature and humidity conditions as for the drying operation.

The specimens are drawn at a speed of 50 mm/minute and the distance between the jaws is 50 mm, which corresponds to the initial length (l_0) of the specimen.

The instantaneous recovery R_i is determined in the following manner:

- the specimen is stretched by 30% (ϵ_{max}), i.e. about 0.3 times its initial length (l_0)
- the stress is released by applying a return speed equal to the tensile speed, i.e. 50 mm/minute, and the residual percentage elongation of the specimen, after returning to zero load (ϵ_i), is measured.

The percentage instantaneous recovery (R_i) is given by the formula below:

$$R_i = ((\epsilon_{\text{max}} - \epsilon_i) / \epsilon_{\text{max}}) \times 100$$

To determine the delayed recovery, the residual elongation of the sample is measured as a percentage (ϵ_{2h}), 2 hours after returning to zero stress.

The percentage delayed recovery (R_{2h}) is given by the formula below:

$$R_{2h} = ((\epsilon_{\max} - \epsilon_{2h}) / \epsilon_{\max}) \times 100$$

Purely by way of indication, a polymer
5 according to an embodiment of the invention has an instantaneous recovery R_i of 10% and a delayed recovery R_{2h} of 30%.

According to another embodiment, the block polymer of the composition according to the invention
10 does not comprise any styrene units. The expression "polymer free of styrene units" means a polymer comprising less than 10%, preferably less than 5%, preferentially less than 2% and more preferentially less than 1% by weight i) of styrene units of formula
15 $-\text{CH}(\text{C}_6\text{H}_5)-\text{CH}_2-$ or ii) of substituted styrene units, for instance methylstyrene, chlorostyrene or chloromethylstyrene.

According to one embodiment, the block polymer of the composition according to the invention
20 is derived from aliphatic ethylenic monomers. The term "aliphatic monomer" means a monomer comprising no aromatic groups.

According to one embodiment, the block polymer is an ethylenic polymer derived from aliphatic
25 ethylenic monomers comprising a carbon-carbon double bond and at least one ester group $-\text{COO}-$ or amide group $-\text{CON}-$. The ester group may be linked to one of the two

unsaturated carbons via the carbon atom or the oxygen atom. The amide group may be linked to one of the two unsaturated carbons via the carbon atom or the nitrogen atom.

5 According to one embodiment, the block polymer comprises at least one first block and at least one second block.

 The term "at least one block" means one or more blocks.

10 It is pointed out that, in the text hereinabove and hereinbelow, the terms "first" and "second" blocks do not in any way condition the order of the said blocks in the polymer structure.

 According to one embodiment, the block
15 polymer comprises at least one first block and at least one second block that have different glass transition temperatures (T_g).

 In this embodiment, the first and second blocks may be linked together via an intermediate
20 segment with a glass transition temperature between the glass transition temperatures of the first and second blocks.

 According to one embodiment, the block polymer comprises at least one first block and at least
25 one second block linked together via an intermediate segment comprising at least one constituent monomer of

the first block and at least one constituent monomer of the second block.

Preferably, the intermediate block is derived essentially from constituent monomers of the first
5 block and of the second block.

The term "essentially" means at least 85%, preferably at least 90%, better still 95% and even better still 100%.

Advantageously, the intermediate segment
10 comprising at least one constituent monomer of the first block and at least one constituent monomer of the second block of the polymer is a random polymer.

According to one embodiment, the block polymer comprises at least one first block and at least
15 one second block that are incompatible in the organic liquid medium of the composition of the invention.

The term "mutually incompatible blocks" means that the mixture formed from the polymer corresponding to the first block and from the polymer corresponding
20 to the second block is not miscible in the organic liquid that is in major amount by weight contained in the organic liquid medium of the composition, at room temperature (25°C) and atmospheric pressure (10^5 Pa), for a content of the polymer mixture of greater than or
25 equal to 5% by weight, relative to the total weight of the mixture (polymers and major organic liquid), it being understood that:

- i) the said polymers are present in the mixture in a content such that the respective weight ratio ranges from 10/90 to 90/10, and
- ii) each of the polymers corresponding to the first and second blocks has an average (weight-average or number-average) molecular mass equal to that of the block polymer $\pm 15\%$.

When the organic liquid medium comprises a mixture of organic liquids, in the case of two or more liquids present in identical mass proportions, the said polymer mixture is immiscible in at least one of them.

When the organic liquid medium comprises only one organic liquid, this liquid obviously constitutes the liquid that is in major amount by weight.

The term "organic liquid medium" means a medium containing at least one organic liquid, i.e. at least one organic compound that is liquid at room temperature (25°C) and atmospheric pressure (10^5 Pa). According to one embodiment, the major liquid of the organic liquid medium is a volatile or non-volatile oil (fatty substance). Preferably, the organic liquid is cosmetically acceptable (acceptable tolerance, toxicology and feel). The organic liquid medium is cosmetically acceptable, in the sense that it is compatible with keratin materials, for instance the oils or organic solvents commonly used in cosmetic compositions.

According to one embodiment, the major liquid of the organic liquid medium is the polymerization solvent or one of the polymerization solvents of the block polymer, as are described below.

5 The term "polymerization solvent" means a solvent or a mixture of solvents. The polymerization solvent may be chosen especially from ethyl acetate, butyl acetate, alcohols such as isopropanol and ethanol, aliphatic alkanes such as isododecane, and
10 mixtures thereof. Preferably, the polymerization solvent is a mixture of butyl acetate and isopropanol, or isododecane.

In general, the block polymer may be incorporated into the composition to a high solids
15 content, typically greater than 10%, greater than 20%, more preferably greater than 30% and more preferentially greater than 45% by weight relative to the total weight of the composition, while at the same time being easy to formulate.

20 Preferably, the block polymer comprises no silicon atoms in its skeleton. The term "skeleton" means the main chain of the polymer, as opposed to the pendent side chains.

Preferably, the polymer according to the
25 invention is not water-soluble, i.e. the polymer is not soluble in water or in a mixture of water and linear or branched lower monoalcohols containing from 2 to 5

carbon atoms, for instance ethanol, isopropanol or n-propanol, without pH modification, at an active material content of at least 1% by weight, at room temperature (25°C).

5 According to one embodiment, the block polymer has a polydispersity index I of greater than 2.

Advantageously, the block polymer used in the compositions according to the invention has a polydispersity index greater than 2, for example
10 ranging from 2 to 9, preferably greater than or equal to 2.5, for example ranging from 2.5 to 8 and better still greater than or equal to 2.8 and especially ranging from 2.8 to 6.

The polydispersity index I of the polymer is
15 equal to the ratio of the weight-average mass M_w to the number-average mass M_n .

The weight-average molar mass (M_w) and number-average molar mass (M_n) are determined by gel permeation liquid chromatography (THF solvent,
20 calibration curve established with linear polystyrene standards, refractometric detector).

The weight-average mass (M_w) of the block polymer is preferably less than or equal to 300 000; it ranges, for example, from 35 000 to 200 000 and better
25 still from 45 000 to 150 000.

The number-average mass (M_n) of the block polymer is preferably less than or equal to 70 000; it

ranges, for example, from 10 000 to 60 000 and better still from 12 000 to 50 000.

Each block of the block polymer is derived from one type of monomer or from several different
5 types of monomer.

This means that each block may consist of a homopolymer or a copolymer; this copolymer constituting the block may in turn be random or alternating.

The glass transition temperatures indicated
10 for the first and second blocks may be theoretical Tg values determined from the theoretical Tg values of the constituent monomers of each of the blocks, which may be found in a reference manual such as the Polymer Handbook, 3rd Edition, 1989, John Wiley, according to
15 the following relationship, known as Fox's law:

$$1/T_g = \sum_i (\bar{w}_i / T_{g_i}),$$

\bar{w}_i being the mass fraction of the monomer i in the block under consideration and T_{g_i} being the glass
20 transition temperature of the homopolymer of the monomer i .

Unless otherwise indicated, the Tg values indicated for the first and second blocks in the present patent application are theoretical Tg values.

25 The difference between the glass transition temperatures of the first and second blocks is

generally greater than 10°C, preferably greater than 20°C and better still greater than 30°C.

In particular, the block polymer comprises at least one first block and at least one second block
5 such that the first block may be chosen from:
a) a block with a Tg of greater than or equal to 40°C,
b) a block with a Tg of less than or equal to 20°C,
c) a block with a Tg of between 20 and 40°C, and the second block may be chosen from a category a), b) or c)
10 that is different from the first block.

In the present invention, the expression:
"between ... and ..." is intended to denote a range of values for which the limits mentioned are excluded, and
"from ... to ..." and "ranging from ... to ..." are
15 intended to denote a range of values for which the limits are included.

a) Block with a Tg of greater than or equal to 40°C

The block with a Tg of greater than or equal to 40°C has, for example, a Tg ranging from 40 to
20 150°C, preferably greater than or equal to 50°C, for example ranging from 50°C to 120°C and better still greater than or equal to 60°C, for example ranging from 60°C to 120°C.

The block with a Tg of greater than or equal
25 to 40°C may be a homopolymer or a copolymer.

The block with a Tg of greater than or equal to 40°C may be totally or partially derived from one or

more monomers which are such that the homopolymer prepared from these monomers has a glass transition temperature of greater than or equal to 40°C.

In the case where this block is a
5 homopolymer, it is derived from monomers which are such that the homopolymers prepared from these monomers have glass transition temperatures of greater than or equal to 40°C. This first block may be a homopolymer consisting of only one type of monomer (for which the
10 Tg of the corresponding homopolymer is greater than or equal to 40°C).

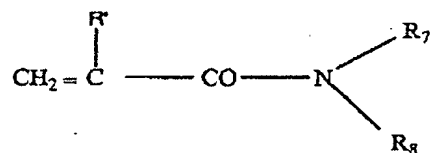
In the case where the first block is a copolymer, it may be totally or partially derived from one or more monomers, the nature and concentration of
15 which are chosen such that the Tg of the resulting copolymer is greater than or equal to 40°C. The copolymer may comprise, for example:

- monomers which are such that the homopolymers prepared from these monomers have Tg values of greater
20 than or equal to 40°C, for example a Tg ranging from 40 to 150°C, preferably greater than or equal to 50°C, for example ranging from 50°C to 120°C and better still greater than or equal to 60°C, for example ranging from 60°C to 120°C, and
- 25 - monomers which are such that the homopolymers prepared from these monomers have Tg values of less than 40°C, chosen from monomers with a Tg of between 20

and 40°C and/or monomers with a Tg of less than or equal to 20°C, for example a Tg ranging from -100 to 20°C, preferably less than 15°C, especially ranging from -80°C to 15°C and better still less than 10°C, for example ranging from -50°C to 0°C, as described later.

The monomers whose homopolymers have a glass transition temperature of greater than or equal to 40°C are chosen, for example, from the following monomers, also known as the main monomers:

- 10 - methacrylates of formula $\text{CH}_2 = \text{C}(\text{CH}_3) - \text{COOR}_1$
 in which R_1 represents a linear or branched unsubstituted alkyl group containing from 1 to 4 carbon atoms, such as a methyl, ethyl, propyl or isobutyl group or R_1 represents a C_4 to C_{12} cycloalkyl group,
- 15 - acrylates of formula $\text{CH}_2 = \text{CH} - \text{COOR}_2$
 in which R_2 represents a C_4 to C_{12} cycloalkyl group such as isobornyl acrylate or a tert-butyl group,
- (meth)acrylamides of formula:



- 20 in which R_7 and R_8 , which may be identical or different, each represent a hydrogen atom or a linear or branched C_1 to C_{12} alkyl group such as an n-butyl, t-butyl, isopropyl, isohexyl, isooctyl or isononyl group; or R_7 represents H and R_8 represents a 1,1-dimethyl-3-oxobutyl
- 25 group,

and R' denotes H or methyl. Examples of monomers that may be mentioned include N-butylacrylamide, N-t-butylacrylamide, N-isopropylacrylamide, N,N-dimethylacrylamide and N,N-dibutylacrylamide,

5 - and mixtures thereof.

Main monomers that are particularly preferred are methyl methacrylate, isobutyl (meth)acrylate and isobornyl (meth)acrylate, and mixtures thereof.

b) Block with a Tg of less than or equal to 20°C

10 The block with a Tg of less than or equal to 20°C has, for example, a Tg ranging from -100 to 20°C, preferably less than or equal to 15°C, especially ranging from -80°C to 15°C and better still less than or equal to 10°C, for example ranging from -50°C to
15 0°C.

The block with a Tg of less than or equal to 20°C may be a homopolymer or a copolymer.

The block with a Tg of less than or equal to 20°C may be totally or partially derived from one or
20 more monomers which are such that the homopolymer prepared from these monomers has a glass transition temperature of less than or equal to 20°C.

In the case where this block is a homopolymer, it is derived from monomers which are such
25 that the homopolymers prepared from these monomers have glass transition temperatures of less than or equal to 20°C. This second block may be a homopolymer consisting

of only one type of monomer (for which the Tg of the corresponding homopolymer is less than or equal to 20°C).

In the case where the block with a Tg of less than or equal to 20°C is a copolymer, it may be totally or partially derived from one or more monomers, the nature and concentration of which are chosen such that the Tg of the resulting copolymer is less than or equal to 20°C.

It may comprise, for example

- one or more monomers whose corresponding homopolymer has a Tg of less than or equal to 20°C, for example a Tg ranging from -100°C to 20°C, preferably less than 15°C, especially ranging from -80°C to 15°C and better still less than 10°C, for example ranging from -50°C to 0°C, and
- one or more monomers whose corresponding homopolymer has a Tg of greater than 20°C, such as monomers with a Tg of greater than or equal to 40°C, for example a Tg ranging from 40 to 150°C, preferably greater than or equal to 50°C, for example ranging from 50°C to 120°C and better still greater than or equal to 60°C, for example ranging from 60°C to 120°C and/or monomers with a Tg of between 20 and 40°C, as described above.

Preferably, the block with a Tg of less than or equal to 20°C is a homopolymer.

The monomers whose homopolymer has a Tg of less than or equal to 20°C are preferably chosen from the following monomers, or main monomer:

- acrylates of formula $\text{CH}_2 = \text{CHCOOR}_3$,
- 5 R_3 representing a linear or branched C_1 to C_{12} unsubstituted alkyl group, with the exception of the tert-butyl group, in which one or more hetero atoms chosen from O, N and S is (are) optionally intercalated,
- 10 - methacrylates of formula $\text{CH}_2 = \text{C}(\text{CH}_3)\text{-COOR}_4$,
 R_4 representing a linear or branched C_6 to C_{12} unsubstituted alkyl group, in which one or more hetero atoms chosen from O, N and S is (are) optionally intercalated,
- 15 - vinyl esters of formula $\text{R}_5\text{-CO-O-CH} = \text{CH}_2$
 in which R_5 represents a linear or branched C_4 to C_{12} alkyl group,
- C_4 to C_{12} alkyl vinyl ethers,
- N-(C_4 to C_{12})alkyl acrylamides, such as N-
- 20 octylacrylamide,
- and mixtures thereof.

The main monomers that are particularly preferred for the block with a Tg of less than or equal to 20°C are alkyl acrylates whose alkyl chain contains
 25 from 1 to 10 carbon atoms, with the exception of the tert-butyl group, such as methyl acrylate, isobutyl

acrylate and 2-ethylhexyl acrylate, and mixtures thereof.

c) Block with a Tg of between 20 and 40°C

The block with a Tg of between 20 and 40°C
5 may be a homopolymer or a copolymer.

The block with a Tg of between 20 and 40°C
may be totally or partially derived from one or more
monomers which are such that the homopolymer prepared
from these monomers has a glass transition temperature
10 of between 20 and 40°C.

The block with a Tg of between 20 and 40°C
may be totally or partially derived from monomers which
are such that the corresponding homopolymer has a Tg of
greater than or equal to 40°C, and from monomers which
15 are such that the corresponding homopolymer has a Tg of
less than or equal to 20°C.

In the case where this block is a
homopolymer, it is derived from monomers (or main
monomer) which are such that the homopolymers prepared
20 from these monomers have glass transition temperatures
of between 20 and 40°C. This first block may be a
homopolymer, consisting of only one type of monomer
(for which the Tg of the corresponding homopolymer
ranges from 20°C to 40°C).

25 The monomers whose homopolymer has a glass
transition temperature of between 20 and 40°C are
preferably chosen from n-butyl methacrylate, cyclodecyl

acrylate, neopentyl acrylate and isodecylacrylamide, and mixtures thereof.

In the case where the block with a Tg of between 20 and 40°C is a copolymer, it is totally or
5 partially derived from one or more monomers (or main monomer) whose nature and concentration are chosen such that the Tg of the resulting copolymer is between 20 and 40°C.

Advantageously, the block with a Tg of
10 between 20 and 40°C is a copolymer totally or partially derived from:

- main monomers whose corresponding homopolymer has a Tg of greater than or equal to 40°C, for example a Tg ranging from 40°C to 150°C, preferably greater than or
15 equal to 50°C, for example ranging from 50 to 120°C and better still greater than or equal to 60°C, for example ranging from 60°C to 120°C, as described above, and/or
- main monomers whose corresponding homopolymer has a Tg of less than or equal to 20°C, for example a Tg
20 ranging from -100 to 20°C, preferably less than or equal to 15°C, especially ranging from -80°C to 15°C and better still less than or equal to 10°C, for example ranging from -50°C to 0°C, as described above, the said monomers being chosen such that the Tg of the
25 copolymer forming the first block is between 20 and 40°C.

Such main monomers are chosen, for example, from methyl methacrylate, isobornyl acrylate and methacrylate, butyl acrylate and 2-ethylhexyl acrylate, and mixtures thereof.

5 Preferably, the proportion of the second block with a Tg of less than or equal to 20°C ranges from 10% to 85% by weight, better still from 20% to 70% and even better still from 20% to 50% by weight of the polymer.

10 Preferably, each of the first and second blocks comprises at least one monomer chosen from acrylic acid, acrylic acid esters, (meth)acrylic acid and (meth)acrylic acid esters, and mixtures thereof.

 Advantageously, each of the first and second
15 blocks is totally derived from at least one monomer chosen from acrylic acid, acrylic acid esters, (meth)acrylic acid and (meth)acrylic acid esters, and mixtures thereof.

 However, each of the blocks may contain in
20 small proportion at least one constituent monomer of the other block.

 Thus, the first block may contain at least one constituent monomer of the second block, and vice versa.

25 Each of the first and/or second blocks may comprise, in addition to the monomers indicated above, one or more other monomers known as additional

monomers, which are different from the main monomers mentioned above.

The nature and amount of this or these additional monomer(s) are chosen such that the block in which they are present has the desired glass transition temperature.

This additional monomer is chosen, for example, from:

hydrophilic monomers such as:

- 10 - ethylenically unsaturated monomers comprising at least one carboxylic or sulphonic acid function, for instance:

acrylic acid, methacrylic acid, crotonic acid, maleic anhydride, itaconic acid, fumaric acid, maleic acid, acrylamidopropanesulphonic acid, vinylbenzoic acid, vinylphosphoric acid, and salts thereof,

- 15 - ethylenically unsaturated monomers comprising at least one tertiary amine function, for instance 20 2-vinylpyridine, 4-vinylpyridine, dimethylaminoethyl methacrylate, diethylaminoethyl methacrylate and dimethylaminopropylmethacrylamide, and salts thereof,

- 25 - methacrylates of formula $\text{CH}_2 = \text{C}(\text{CH}_3) - \text{COOR}_6$ in which R_6 represents a linear or branched alkyl group containing from 1 to 4 carbon atoms, such as a methyl, ethyl, propyl or isobutyl group, the

said alkyl group being substituted with one or more substituents chosen from hydroxyl groups (for instance 2-hydroxypropyl methacrylate and 2-hydroxyethyl methacrylate) and halogen atoms (Cl, Br, I or F), such as trifluoroethyl methacrylate,

- methacrylates of formula $\text{CH}_2 = \text{C}(\text{CH}_3) - \text{COOR}_9$, R_9 representing a linear or branched C_6 to C_{12} alkyl group in which one or more hetero atoms chosen from O, N and S is (are) optionally intercalated, the said alkyl group being substituted with one or more substituents chosen from hydroxyl groups and halogen atoms (Cl, Br, I or F);

- acrylates of formula $\text{CH}_2 = \text{CHCOOR}_{10}$,

R_{10} representing a linear or branched C_1 to C_{12} alkyl group substituted with one or more substituents chosen from hydroxyl and halogen atoms (Cl, Br, I or F), such as 2-hydroxypropyl acrylate and 2-hydroxyethyl acrylate, or R_{10} represents a $(\text{C}_1 - \text{C}_{12})$ alkyl-O-POE (polyoxyethylene) with repetition of the oxyethylene unit 5 to 30 times, for example methoxy-POE, or R_{10} represents a polyoxyethylenated group comprising from 5 to 30 ethylene oxide units

b) ethylenically unsaturated monomers comprising one or more silicon atoms, such as methacryloxy-

propyltrimethoxysilane and methacryloxypropyl-
tris(trimethylsiloxy)silane,
- and mixtures thereof.

Additional monomers that are particularly
5 preferred are acrylic acid, methacrylic acid and
trifluoroethyl methacrylate, and mixtures thereof.

According to one embodiment, each of the
first and second blocks of the block polymer comprises
at least one monomer chosen from (meth)acrylic acid
10 esters and optionally at least one additional monomer
such as (meth)acrylic acid, and mixtures thereof.

According to another embodiment, each of the
first and second blocks of the block polymer is totally
derived from at least one monomer chosen from
15 (meth)acrylic acid esters and optionally from at least
one additional monomer such as (meth)acrylic acid, and
mixtures thereof.

According to one preferred embodiment, the
block polymer is a non-silicone polymer, i.e. a polymer
20 free of silicon atoms.

This or these additional monomer(s) generally
represent(s) an amount of less than or equal to 30% by
weight, for example from 1% to 30% by weight,
preferably from 5% to 20% by weight and more preferably
25 from 7% to 15% by weight, relative to the total weight
of the first and/or second blocks.

The block polymer may be obtained by free-radical solution polymerization according to the following preparation process:

5 a portion of the polymerization solvent is introduced into a suitable reactor and heated until the adequate temperature for the polymerization is reached (typically between 60 and 120°C),

10 once this temperature is reached, the constituent monomers of the first block are introduced in the presence of some of the polymerization initiator, after a time T corresponding to a maximum degree of conversion of 90%, the constituent monomers of the second block and the rest of the initiator are

15 introduced,

the mixture is left to react for a time T' (ranging from 3 to 6 hours), after which the mixture is cooled to room temperature,

20 the polymer dissolved in the polymerization solvent is obtained.

First embodiment

According to a first embodiment, the block polymer comprises a first block with a Tg of greater than or equal to 40°C, as described above in a) and a

25 second block with a Tg of less than or equal to 20°C, as described above in b).

Preferably, the first block with a Tg of greater than or equal to 40°C is a copolymer derived from monomers which are such that the homopolymer prepared from these monomers has a glass transition temperature of greater than or equal to 40°C, such as the monomers described above.

Advantageously, the second block with a Tg of less than or equal to 20°C is a homopolymer derived from monomers which are such that the homopolymer prepared from these monomers has a glass transition temperature of less than or equal to 20°C, such as the monomers described above.

Preferably, the proportion of the block with a Tg of greater than or equal to 40°C ranges from 20% to 90%, better still from 30% to 80% and even better still from 50% to 70% by weight of the polymer. Preferably, the proportion of the block with a Tg of less than or equal to 20°C ranges from 5% to 75%, preferably from 15% to 50% and better still from 25% to 45% by weight of the polymer.

Thus, according to a first variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example having a Tg ranging from 70 to 110°C, which is a methyl methacrylate/acrylic acid copolymer,

- a second block with a Tg of less than or equal to 20°C, for example ranging from 0 to 20°C, which is a methyl acrylate homopolymer, and
- an intermediate block which is a methyl methacrylate/acrylic acid/methyl acrylate copolymer.

According to a second variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example ranging from 70 to 100°C, which is a methyl methacrylate/acrylic acid/trifluoroethyl methacrylate copolymer,
- a second block with a Tg of less than or equal to 20°C, for example ranging from 0 to 20°C, which is a methyl acrylate homopolymer, and
- an intermediate block which is a methyl methacrylate/acrylic acid/methyl acrylate/trifluoroethyl methacrylate random copolymer.

According to a third variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example ranging from 85 to 115°C, which is an isobornyl acrylate/isobutyl methacrylate copolymer,
- a second block with a Tg of less than or equal to 20°C, for example ranging from -85 to -55°C, which is a 2-ethylhexyl acrylate homopolymer, and

- an intermediate block, which is an isobornyl acrylate/isobutyl methacrylate/2-ethylhexyl acrylate random copolymer.

According to a fourth variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example ranging from 85 to 115°C, which is an isobornyl acrylate/methyl methacrylate copolymer,
- a second block with a Tg of less than or equal to 20°C, for example ranging from -85 to -55°C, which is a 2-ethylhexyl acrylate homopolymer, and
- an intermediate block which is an isobornyl acrylate/methyl methacrylate/2-ethylhexyl acrylate random copolymer.

According to a fifth variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example ranging from 95 to 125°C, which is an isobornyl acrylate/isobornyl methacrylate copolymer,
- a second block with a Tg of less than or equal to 20°C, for example ranging from -85 to -55°C, which is a 2-ethylhexyl acrylate homopolymer, and
- an intermediate block which is an isobornyl acrylate/isobornyl methacrylate/2-ethylhexyl acrylate random copolymer.

According to a sixth variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example ranging from 85 to 115°C, which is an isobornyl methacrylate/isobutyl methacrylate copolymer,
- a second block with a Tg of less than or equal to 20°C, for example ranging from -35 to -5°C, which is an isobutyl acrylate homopolymer, and
- an intermediate block which is an isobornyl methacrylate/isobutyl methacrylate/isobutyl acrylate random copolymer.

10 According to a seventh variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example ranging from 95 to 125°C, which is an isobornyl acrylate/isobornyl methacrylate copolymer,
- 15 - a second block with a Tg of less than or equal to 20°C, for example ranging from -35 to -5°C, which is an isobutyl acrylate homopolymer, and
- an intermediate block which is an isobornyl acrylate/isobornyl methacrylate/isobutyl acrylate
- 20 random copolymer.

 According to an eighth variant, the polymer according to the invention may comprise:

- a first block with a Tg of greater than or equal to 40°C, for example ranging from 60 to 90°C, which is an isobornyl acrylate/isobutyl methacrylate copolymer,
- 25

- a second block with a Tg of less than or equal to 20°C, for example ranging from -35 to -5°C, which is an isobutyl acrylate homopolymer, and
- an intermediate block which is an isobornyl acrylate/isobutyl methacrylate/isobutyl acrylate random copolymer.

The examples that follow illustrate, in a non-limiting manner, polymers corresponding to this first embodiment.

10 The amounts are expressed in grams.

Example 1: Preparation of a poly(methyl methacrylate)/acrylic acid/methyl acrylate) polymer

100 g of butyl acetate are introduced into a 1 litre reactor and the temperature is then raised so as to pass from room temperature (25°C) to 90°C in 1 hour. 180 g of methyl methacrylate, 30 g of acrylic acid, 40 g of butyl acetate, 70 g of isopropanol and 1.8 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane (Trigonox[®] 141 from Akzo Nobel) are then added, at 90°C and over 1 hour.

The mixture is maintained at 90°C for 1 hour.

90 g of methyl acrylate, 70 g of butyl acetate, 20 g of isopropanol and 1.2 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane are then introduced into the above mixture, still at 90°C and over 1 hour.

The mixture is maintained at 90°C for 3 hours and then diluted with 105 g of butyl acetate and 45 g of isopropanol, and the mixture is then cooled.

A solution containing 40% polymer active material in a butyl acetate/isopropanol mixture is obtained.

A polymer comprising a poly(methyl methacrylate/acrylic acid) first block with a Tg of 100°C, a polymethyl acrylate second block with a Tg of 10°C and an intermediate block which is a methyl methacrylate/acrylic acid/polymethyl acrylate random polymer is obtained.

This polymer has a weight-average mass of 52 000 and a number-average mass of 18 000, i.e. a polydispersity index I of 2.89.

Second embodiment

According to a second embodiment, the block polymer comprises a first block having a glass transition temperature (Tg) of between 20 and 40°C, in accordance with the blocks described in c) and a second block having a glass transition temperature of less than or equal to 20°C, as described above in b) or a glass transition temperature of greater than or equal to 40°C, as described in a) above.

Preferably, the proportion of the first block with a Tg of between 20 and 40°C ranges from 10% to 85%

by weight of the polymer, better still from 30% to 80% and even better still from 50% to 70%.

When the second block is a block with a Tg of greater than or equal to 40°C, it is preferably present
5 in a proportion ranging from 10% to 85% by weight, better still from 20% to 70% and even better still from 30% to 70% by weight of the polymer.

When the second block is a block with a Tg of less than or equal to 20°C, it is preferably present in
10 a proportion ranging from 10% to 85% by weight, better still from 20% to 70% and even better still from 20% to 50% by weight of the polymer.

Preferably, the first block with a Tg of between 20 and 40°C is a copolymer derived from
15 monomers which are such that the corresponding homopolymer has a Tg of greater than or equal to 40°C, and from monomers which are such that the corresponding homopolymer has a Tg of less than or equal to 20°C.

Advantageously, the second block with a Tg of
20 less than or equal to 20°C or with a Tg of greater than or equal to 40°C is a homopolymer.

Thus, according to a first variant of this second embodiment, the block polymer may comprise:
- a first block with a Tg of between 20 and 40°C, for
25 example with a Tg of 25 to 39°C, which is a copolymer comprising at least one methyl acrylate monomer, at

least one methyl methacrylate monomer and at least one acrylic acid monomer,

- a second block with a Tg of greater than or equal to 40°C, for example ranging from 85 to 125°C, which is a homopolymer composed of methyl methacrylate monomers, and
- an intermediate block comprising at least one methyl acrylate, methyl methacrylate monomer, and
- an intermediate block comprising methyl methacrylate, at least one acrylic acid monomer and at least one methyl acrylate monomer.

According to a second variant of this second embodiment, the block polymer may comprise:

- a first block with a Tg of between 20 and 40°C, for example with a Tg of 21 to 39°C, which is a copolymer comprising isobornyl acrylate/isobutyl methacrylate/2-ethylhexyl acrylate,
- a second block with a Tg of less than or equal to 20°C, for example ranging from -65 to -35°C, which is a methyl methacrylate homopolymer, and
- an intermediate block which is an isobornyl acrylate/isobutyl methacrylate/2-ethylhexyl acrylate random copolymer.

According to a third variant of this second embodiment, the block polymer may comprise:

- a first block with a Tg of between 20 and 40°C, for example with a Tg from 21 to 39°C, which is an

isobornyl acrylate/methyl acrylate/acrylic acid
copolymer,

- a second block with a Tg of greater than or equal to 40°C, for example ranging from 85 to 115°C, which is an
- 5 isobornyl acrylate homopolymer, and
- an intermediate block which is an isobornyl acrylate/methyl acrylate/acrylic acid random copolymer.

By way of non-limiting illustration, the polymers corresponding to this second embodiment may be
10 produced as follows.

Example 2: Preparation of a poly(methyl methacrylate)/methyl acrylate/acrylic acid) polymer

100 g of butyl acetate are introduced into a 1 litre reactor and the temperature is then raised so
15 as to pass from room temperature (25°C) to 90°C in 1 hour. 50.4 g of methyl methacrylate, 21 g of acrylic acid, 138.6 g of methyl acrylate, 40 g of butyl acetate, 70 g of isopropanol and 1.8 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane
20 (Trigonox[®] 141 from Akzo Nobel) are then added, at 90°C and over 1 hour.

The mixture is maintained at 90°C for 1 hour.

90 g of methyl methacrylate, 70 g of butyl acetate, 20 g of isopropanol and 1.2 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane are then
25 introduced into the above mixture, still at 90°C and over 1 hour.

The mixture is maintained at 90°C for 3 hours and then diluted with 105 g of butyl acetate and 45 g of isopropanol, and the mixture is then cooled.

A solution containing 40% polymer active material in a butyl acetate/isopropanol mixture is obtained.

The polymer obtained comprises a first poly(methyl acrylate/methyl methacrylate/acrylic acid) block with a Tg of 35°C, a second poly(methyl methacrylate) block with a Tg of 100°C and an intermediate block that is a methyl methacrylate/acrylic acid/polymethyl acrylate random polymer.

Generally, the compositions of the invention contain from 0.1% to 60% by weight, preferably from 0.5% to 50% by weight and more preferably from 1% to 40% by weight of the block polymer according to the invention.

Solvent medium

The cosmetic composition may comprise an organic solvent medium or a mixture of organic solvents.

The organic solvent may be chosen from:

- ketones that are liquid at room temperature, such as methyl ethyl ketone, methyl isobutyl ketone, diisobutyl ketone, isophorone, cyclohexanone or acetone;

- alcohols that are liquid at room temperature, such as ethanol, isopropanol, diacetone alcohol, 2-butoxyethanol or cyclohexanol;
- glycols that are liquid at room temperature, such as ethylene glycol, propylene glycol, pentylene glycol or glycerol;
- propylene glycol ethers that are liquid at room temperature such as propylene glycol monomethyl ether, propylene glycol monomethyl ether acetate or dipropylene glycol mono-n-butyl ether;
- cyclic ethers such as γ -butyrolactone;
- short-chain esters (containing from 3 to 8 carbon atoms in total) such as ethyl acetate, methyl acetate, propyl acetate, isopropyl acetate, n-butyl acetate, isopentyl acetate, methoxypropyl acetate or butyl lactate;
- ethers that are liquid at room temperature, such as diethyl ether, dimethyl ether or dichlorodiethyl ether;
- alkanes that are liquid at room temperature, such as decane, heptane, dodecane or cyclohexane;
- alkyl sulphoxides, such as dimethyl sulphoxide;
- aldehydes that are liquid at room temperature, such as benzaldehyde or acetaldehyde;
- heterocyclic compounds such as tetrahydrofuran; propylene carbonate or ethyl 3-ethoxypropionate;
- mixtures thereof.

The organic solvent medium preferably has a polarity P ranging from 0.422 to 0.725.

The polarity is defined as a function of the solubility parameters according to the Hansen
5 solubility space, according to the following relationship:

$$P = \sqrt{(\delta_p^2 + \delta_h^2)} / \delta_t$$

- δ_h characterizing the specific forces of interaction (such as hydrogen bonding, acid/base bonding, donor/
10 acceptor bonding, etc.);
- δ_p characterizing the Debye interaction forces between permanent dipoles and also the Keesom interaction forces between induced dipoles and permanent dipoles; and
- 15 - $\delta_t = \sqrt{(\delta_p^2 + \delta_h^2 + \delta_d^2)}$, δ_d characterizing the London dispersion forces derived from the formation of induced dipoles during molecular impacts.

The definition and calculation of the solubility parameters in the Hansen three-dimensional
20 solubility space are described in the article by C.M. Hansen: "The three dimensional solubility parameters" J. Paint Technol. 39, 105 (1967).

When the solvent medium comprises a mixture of solvents, the polarity is determined from the
25 solubility parameters of the mixture, which are themselves determined from those of the compounds taken separately, according to the following relationships:

$$\delta_{dmixt} = \sum_i x_i \delta_{di}; \quad \delta_{pmixt} = \sum_i x_i \delta_{pi} \quad \text{and} \quad \delta_{hmixt} = \sum_i x_i \delta_{hi}$$

in which x_i represents the volume fraction of the compound i in the mixture.

5 As organic solvents with a polarity ranging from 0.422 to 0.725, mention may be made in particular of methyl acetate, isopropyl acetate, methoxypropyl acetate, butyl lactate, acetone, methyl ethyl ketone, diacetone alcohol, γ -butyrolactone, tetrahydrofuran,
10 propylene carbonate, ethyl 3-ethoxypropionate and dimethyl sulphoxide, and mixtures thereof.

The organic solvent medium may represent from 10% to 95% by weight, preferably from 15% to 80% by weight and better still from 20% to 60% by weight,
15 relative to the total weight of the composition.

Additional film-forming polymer

The composition may comprise, besides the block polymer of the composition according to the invention, an additional polymer such as a film-forming
20 polymer.

Among the film-forming polymers that may be used in the composition of the present invention, mention may be made of synthetic polymers, of free-radical type or of polycondensate type, and polymers of
25 natural origin, and mixtures thereof.

The film-forming polymer may be chosen in particular from cellulose-based polymers such as

cellulose acetate, cellulose acetobutyrate, cellulose
acetopropionate or ethylcellulose, or alternatively
polyurethanes, acrylic polymers, vinyl polymers,
polyvinylbutyrals, alkyd resins, resins derived from
5 aldehyde condensation products such as
arylsulphonamide-formaldehyde resins, for instance
toluenesulphonamide-formaldehyde resin, and
arylsulphonamide-epoxy resins.

Film-forming polymers that may especially be
10 used include the toluenesulphonamide-formaldehyde
resins "Ketjentflex MS80" from the company Akzo or
"Santolite MHP" or "Santolite MS 80" from the company
Faconnier or "Resimpol 80" from the company Pan
Americana, the alkyd resin "Beckosol ODE 230-70-E" from
15 the company Dainippon, the acrylic resin "Acryloid B66"
from the company Rohm & Haas, and the polyurethane
resin "Trixene PR 4127" from the company Baxenden.

The additional film-forming polymer may be
present in the composition according to the invention
20 in a content ranging from 0.1% to 60% by weight,
preferably ranging from 2% to 40% by weight and better
still from 5% to 25% by weight, relative to the total
weight of the composition.

Plasticizer

25 The composition may also comprise at least
one plasticizer. In particular, mention may be made,

alone or as a mixture, of the usual plasticizers, such as:

- glycols and derivatives thereof such as diethylene glycol ethyl ether, diethylene glycol methyl ether, 5 diethylene glycol butyl ether or diethylene glycol hexyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether or ethylene glycol hexyl ether;
- glycerol esters,
- propylene glycol derivatives and in particular 10 propylene glycol phenyl ether, propylene glycol diacetate, dipropylene glycol butyl ether, tripropylene glycol butyl ether, propylene glycol methyl ether, dipropylene glycol ethyl ether, tripropylene glycol methyl ether, diethylene glycol methyl ether and 15 propylene glycol butyl ether,
- acid esters, especially carboxylic acid esters, such as citrates, phthalates, adipates, carbonates, tartrates, phosphates or sebacates,
- oxyethylenated derivatives such as oxyethylenated 20 oils, especially plant oils such as castor oil; mixtures thereof.

The amount of plasticizer may be chosen by a person skilled in the art on the basis of his general knowledge, so as to obtain a composition with 25 cosmetically acceptable properties. The plasticizer is preferably present in an amount of less than 20%, preferably less than 15%, better still less than 10%

and even better still less than 5% by weight, relative to the total weight of the composition. The composition according to the invention is preferably free of plasticizer.

5 Dyestuff

The composition according to the invention may also comprise one or more dyestuffs chosen from water-soluble dyes and pulverulent dyestuffs, for instance pigments, nacles and flakes that are well
10 known to those skilled in the art. The dyestuffs may be present in the composition in a content ranging from 0.01% to 50% by weight and preferably from 0.01% to 30% by weight, relative to the weight of the composition.

The term "pigments" should be understood as
15 meaning white or coloured, mineral or organic particles of any shape, which are insoluble in the physiological medium and which are intended to colour the composition.

The term "nacles" should be understood as
20 meaning iridescent particles of any shape, produced especially by certain molluscs in their shell, or alternatively synthesized.

The pigments may be white or coloured, and mineral and/or organic. Among the mineral pigments that
25 may be mentioned are titanium dioxide, optionally surface-treated, zirconium oxide or cerium oxide, and also zinc oxide, iron oxide (black, yellow or red) or

chromium oxide, manganese violet, ultramarine blue, chromium hydrate and ferric blue, and metal powders, for instance aluminium powder or copper powder. Among the organic pigments that may be mentioned are carbon
5 black, pigments of D & C type, and lakes based on cochineal carmine or on barium, strontium, calcium or aluminium.

The nacreous pigments may be chosen from white nacreous pigments such as mica coated with
10 titanium or with bismuth oxychloride, coloured nacreous pigments such as titanium mica coated with iron oxides, titanium mica coated especially with ferric blue or chromium oxide, titanium mica coated with an organic pigment of the abovementioned type and also nacreous
15 pigments based on bismuth oxychloride.

The water-soluble dyes are, for example, beetroot juice or methylene blue.

The composition according to the invention may also comprise one or more fillers, especially in a
20 content ranging from 0.01% to 50% by weight and preferably ranging from 0.01% to 30% by weight, relative to the total weight of the composition. The term "fillers" should be understood as meaning colourless or white, mineral or synthetic particles of
25 any shape, which are insoluble in the medium of the composition, irrespective of the temperature at which the composition is manufactured. These fillers serve

especially to modify the rheology or the texture of the composition.

The fillers may be mineral or organic in any form, platelet-shaped, spherical or oblong, 5 irrespective of the crystallographic form (for example leaflet, cubic, hexagonal, orthorhombic, etc.). Mention may be made of talc, mica, silica, kaolin, polyamide (Nylon®) powders (Orgasol® from Atochem), poly- β -alanine powder and polyethylene powder, powders of 10 polytetrafluoroethylene polymers (Teflon®), lauroyllysine, starch, boron nitride, hollow polymer microspheres such as those of polyvinylidene chloride/acrylonitrile, for instance Exapancel® (Nobel Industrie) or acrylic acid copolymers (Polytrap® from 15 the company Dow Corning) and silicone resin microbeads (for example Tospearls® from Toshiba), elastomeric polyorganosiloxane particles, precipitated calcium carbonate, magnesium carbonate, magnesium hydrocarbonate, hydroxyapatite, hollow silica 20 microspheres (Silica Beads® from Maprecos), glass or ceramic microcapsules, and metal soaps derived from organic carboxylic acids containing from 8 to 22 carbon atoms and preferably from 12 to 18 carbon atoms, for example zinc, magnesium or lithium stearate, zinc 25 laurate or magnesium myristate.

Other additives

The composition may also comprise other ingredients commonly used in cosmetic compositions. Such ingredients may be chosen from spreading agents, wetting agents, dispersants, antifoams, preserving agents, UV-screening agents, active agents, surfactants, moisturizers, fragrances, neutralizers, stabilizers and antioxidants.

Needless to say, a person skilled in the art will take care to select this or these optional additional compound(s), and/or the amount thereof, such that the advantageous properties of the composition according to the invention are not, or are not substantially, adversely affected by the envisaged addition.

Needless to say, a person skilled in the art will take care to select this or these optional additional compound(s) and/or the amount thereof, such that the advantageous properties of the composition for the use according to the invention are not, or are not substantially, adversely affected by the envisaged addition.

A subject of the present invention is also a cosmetic assembly comprising:

- a container delimiting at least one compartment, the said container being closed by a closing member; and

- a composition placed inside the said compartment, the composition being in accordance with the invention.

The container may be in any adequate form. It may especially be in the form of a bottle, a case or a
5 tube.

The closing member may be in the form of a removable stopper.

The container is preferably equipped with an applicator to allow the application of the product to
10 the nails. Such an applicator may be in the form of a fine brush consisting of at least one tuft of hairs. The tuft of hairs may be embedded at the end of a rod borne by the closing member. The hairs are preferably oriented along the axis of the rod. The hairs may be
15 embedded by means of stapling, bonded, or obtained by moulding.

Alternatively, the applicator is in the form of a tape made of porous material, especially of open-cell foam or of felt.

20 Alternatively also, the applicator may be in the form of a spatula, especially made of elastomeric material.

The closing member may be coupled to the container by screwing. Alternatively, the coupling
25 between the closing member and the container is done other than by screwing, especially via a bayonet mechanism or by click-fastening. The term "click-

fastening" in particular means any system involving the crossing of a bead or cord of material by elastic deformation of a portion, especially of the closing member, followed by return to the elastically
 5 unconstrained position of the said portion after the crossing of the bead or cord.

The container is preferably made of glass. However, materials other than glass may be used. Examples that will be mentioned include certain
 10 thermoplastic materials appropriately chosen so as to be compatible with the composition. Alternatively also, the container may be made of metal.

The examples that follow illustrate the invention in a non-limiting manner.

15 **Example 3: Nail varnish**

Polymer of Example 1	23.8 g AM
Butyl acetate	24.99 g
Isopropanol	10.71 g
Hexylene glycol	2.5 g
DC Red 7 Lake	1 g
Hectorite modified with stearyldimethyl- benzylammonium chloride (Bentone® 27V from Elementis)	1.3 g

Example 4: Nail varnish

Polymer of Example 2	23.8 g AM
Butyl acetate	24.99 g
Isopropanol	10.71 g

Hexylene glycol		2.5 g
DC Red 7 Lake		1 g
Hectorite modified with		
stearyldimethylbenzylammonium chloride		
(Bentone® 27V from Elementis)		1.3 g
Ethyl acetate	qs	100 g